

## PATENT CLAIMS

1. A method for the dissociation of double-stranded nucleic acids in a solution into single-stranded nucleic acids, characterized in that the decomposition of the nucleic acids into single strands is performed by irradiation of electro-magnetic waves,  
the frequency and the intensity of the electro-magnetic waves being selected such that the hydrogen bridge bonds between nucleotides of a double-stranded nucleic acid being released by immediate interaction of the electro-magnetic radiation with the double-stranded nucleic acid.

15 2. A method according to claim 1, characterized in that the frequency of the electro-magnetic radiation is adjusted in the range of 10 GHz to 2 THz, preferably 30 to 79 GHz, such that the adjusted frequency excites at least partly such vibration states of the nucleic acid resulting in a separation solely of the hydrogen bridge bonds, not however separating bonds of a polymerase or leading to a temperature increase of a medium.

*Sub A1*

25 3. A utilization of the method according to claim 1 or 2 in a method for the in-vitro amplification of nucleic acids with the following steps: a) decomposition of the nucleic acids into single strands, b) hybridization of primers to the single strands of step a), c) elongation of the hybridized primers of step b) by (desoxy-) ribonucleoside triphosphates by means of a polymerase, d) return of the nucleic acids obtained in step c) into step a), steps a) to d) being repeated so often, until a given amplification factor has been achieved and the electro-magnetic radiation being irradiated in step a).

4. A utilization according to claim 3, **characterized in** that polymerases being optimized to a nucleic acid synthesis speed are use in step b).

*Sub A 5*  
5. A device for carrying-out a method according to one of claims 1 to 4, comprising a reaction chamber for receiving a solution with nucleic acids, a device for generating electro-magnetic waves and an antenna element for irradiating the electro-magnetic radiation, the antenna element being arranged  
10 immediately at the reaction chamber and at least one operating frequency of the device for generating electro-magnetic radiation being in the range of 10 to 250 GHz and/or 0.5 to 2.0 THz.

15 6. A device according to claim 5, **characterized in** that the reaction chamber is disposed within a resonance body operating as an antenna element, in particular a cavity resonator or a waveguide.

*Sub A 20*  
7. A device according to claim 5 or 6, **characterized in** that the reaction chamber is configured as an agitator vessel reactor.

25 8. A device according to one of claim 5 or 6, **characterized in** that the reaction chamber is adapted as a tube reactor, in the interior of the tube reactor and in the direction of longitudinal extension of the tube reactor standing electro-magnetic waves being generated.